

THE SEA SNAKES OF WESTERN AUSTRALIA (SERPENTES: ELAPIDAE, HYDROPHIINAE) WITH A DESCRIPTION OF A NEW SUBSPECIES

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ABSTRACT

The following 15 taxa recorded from Western Australia are described and keyed out: *Aipysurus laevis laevis* Lacépède, *A. laevis pooleorum* subsp. nov., *A. duboisii* Bavay, *A. apraefrontalis* M.A. Smith, *A. tenuis* Lönnberg and Andersson, *A. eydouxii* (Gray), *Hydrophis ocellatus* Gray, *H. major* (Shaw), *H. kingii* Boulenger, *H. elegans* (Gray), *Acalytophis peronii* (Duméril), *Astrotia stokesii* (Gray), *Hydrelaps darwiniensis* Boulenger, *Ephalophis greyii* M.A. Smith and *Pelamis platurus* (Linnaeus). A neotype is selected for *Aipysurus laevis*.

INTRODUCTION

This work began as a synopsis of the sea snakes of Western Australia. However, the discovery of a new subspecies of *Aipysurus laevis* necessitated settling the identity of the holotype of *A. laevis*. To do this I examined all *Aipysurus* from Australian seas which were in Australian museums and some material from the Museum of Comparative Zoology. I have supplied a full synonymy for *A. laevis*. Readers are referred to M.A. Smith (1926) for the synonymies of other species. I have also used extralimital material in the descriptions of species of *Aipysurus* where there are few Western Australian specimens.

I have adopted M.A. Smith's method of counting scales (see M.A. Smith 1926: XVI).

The three species which appear in the key in brackets are species recorded from Ashmore Reef. I have included them in anticipation of their eventual collection on the Western Australian coast.

The following descriptions are based on material from the Western Australian Museum, Queensland Museum, Australian Museum and the Museum of Comparative Zoology; registered numbers of these specimens are prefixed with WAM, QM, AM and MCZ respectively.

KEY TO SPECIES

- | | | | |
|-----|--|----------------------------------|----|
| 1. | Black above, yellow or brown below, the two colours sharply defined by a straight line. Tail yellowish with black spots or bars | <i>Pelamis platurus</i> | |
| | Not so | | 2 |
| 2. | Preocular absent | <i>Hydrelaps darwiniensis</i> | |
| | Preocular present | | 3 |
| 3. | Ventrals bifurcate, strongly imbricate | <i>Astrotia stokesii</i> | |
| | Ventrals entire, juxtaposed or weakly imbricate | | 4 |
| 4. | Three upper labials, the second by far the largest | <i>[Emydocephalus annulatus]</i> | |
| | At least 6 upper labials | | 5 |
| 5. | Ventrals broad, at their widest about 3 times as wide as adjacent dorsals | | 6 |
| | Ventrals narrow, at their widest not more than twice as wide as adjacent dorsals | | 13 |
| 6. | Head shields (excluding rostral and nasals) broken up into small irregular tuberculate scales | <i>Aipysurus duboisii</i> | |
| | Head shields smooth, more or less symmetrical | | 7 |
| 7. | Prefrontals absent | <i>Aipysurus apraefrontalis</i> | |
| | Prefrontals present | | 8 |
| 8. | Loreal present | | 9 |
| | Loreal absent | | 12 |
| 9. | Midbody scale rows 19 | | 10 |
| | Midbody scale rows 21 or 23; ventrals 142-159 | <i>Aipysurus laevis</i> | |
| 10. | Ventrals 187-192 | <i>Aipysurus tenuis</i> | |
| | Ventrals not more than 172 | | 11 |
| 11. | Ventrals 139-153, each with a deep median notch; all other scales on body very strongly imbricate | <i>[Aipysurus foliosquama]</i> | |
| | Ventrals 156-172, median notch weak or absent; subcaudals 24-37; scales imbricate | <i>[Aipysurus fuscus]</i> | |
| 12. | Midbody scale rows 17 | <i>Aipysurus eydouxii</i> | |
| | Midbody scale rows 19 or 21 | <i>Ephalophis greyii</i> | |
| 13. | Scale rows at widest part of body 27-28; nasal in contact with the preocular | <i>Acalyptophis peronii</i> | |
| | Scale rows at widest part of body 33-57; nasal not in contact with the preocular | | 14 |

14.	Ventrals 197-255; head yellowish with darker markings	<i>Hydrophis major</i>
	Ventrals more than 255 head not yellowish	15
15.	Ventrals 354-401; colour pattern if well defined consisting of bands, constricted on flanks, or dorsal and ventral bars	<i>Hydrophis elegans</i>
	Ventrals not as many as 354; colour pattern if well defined has no ventral bars	16
16.	Head black with a white orbital ring; ventrals black; scales at widest part of body 34-39	<i>Hydrophis kingii</i>
	Head olivaceous; ventrals never black; scales at widest part of body 47-57	<i>Hydrophis ocellatus</i>

DESCRIPTION OF SPECIES

Genus *Aipysurus* Lacépède

Reference

M.A. Smith (1926:13)

Description

A relatively large genus with 7 species of which 5 occur in Western Australia.

Size moderate to large. Ventrals 142-192 increasing in width posteriorly to about 3 times the width of adjacent dorsals, usually with a median notch. Midbody scale rows 17-23, the scales weakly to strongly imbricate, vertebral row usually enlarged. Tubercles, if present, confined to males. Head shields entire and symmetrical, or fragmented. Females more massive than males (at least in *A. laevis*).

Ground colour usually yellowish to brown, sometimes with a purplish blue sheen in fresh specimens. Dorsal pattern variable, even within species; usually dark spots mid-dorsally which align to form broken longitudinal stripes, or cross bars which taper rapidly to a point on the flanks.

Aipysurus laevis Lacépède

In 1804 Lacépède described a new sea snake *Aipysurus laevis* from 'New Holland'. Until 1864 Lacépède's name was applied to the snake now known as *A. eydouxii*, but since 1864 almost all workers have followed Gunther in applying *laevis* to the present species.

The identity of Lacépède's snake became further complicated when I discovered that *A. laevis* was divisible into two subspecies:

Aipysurus laevis laevis Lacépède

Aipysurus laevis Lacépède, 1804, *Ann. Mus. Hist. Nat. Paris* 4: 197, 210, pl. lvi fig. 3. New Holland [restricted hereunder to Locker Island, off Onslow, Western Australia].

Hypotropis jukesii Gray, 1826, *Ann. Mag. Nat. Hist.* 18: 284. Darnley Island, Torres Strait.

Aipysurus fuliginosus Duméril and Bibron, 1854, *Erpétologie Générale* 7: 1327.

Diagnosis

The species *laevis* is distinguished by 21 or 23 (rarely 19) scale rows and the presence of a loreal. For diagnosis of subspecies see under next taxon.

Description

The most massive member of the genus, maximum length: males 777 mm (subad.); females 1703 mm. Maximum girth: males 102 mm (subad.); females 225 mm. Head shields irregularly divided but generally retaining their colubroid outline.

Rostral wider than high. Nasals entire separated from 1 or 2 (rarely 3) preoculars by a loreal. Postoculars 2 or 3. Prefrontals 2 (in 86% of specimens), 3 or 4 (see comments under variation). Frontal rarely entire, usually divided asymmetrically into 3 or 4 pieces. Supraoculars transversely divided into two. Parietals always divided, their boundary indistinct. Anterior temporals usually 3. Upper labials 8-10 (9 in 74% of specimens); usually the first 3 (but up to the first 5) small owing to horizontal division: fourth to sixth entering orbit. Lower labials 7-9 (usually 8). One or two pairs of chin shields prominent; anterior pair sometimes, posterior pair always separated by one or two small scales.

Midbody scale rows 21 or 23 (once 19), the scales weakly imbricate. Ventrals: 142-159. Subcaudals: males 31-34, females 22-32.

Uniform creamy-yellow or golden brown (one specimen brown). Head usually darker brown. Juveniles dark bluish-brown on back, broken by irregular pale golden bands one scale wide and 2-4 scales apart. Predominance of blue-brown decreases with age, it being superseded by golden brown. Blue-brown recedes to tips of scales and persists longest on the back where it sometimes remains in subadults as several longitudinal rows of spots.

Variation

All specimens display some division of head shields. Most variable are the prefrontals; their number and orientation are related to variation in frontal length. When the frontal is not unduly prolonged forwards, the two prefrontals are roughly rectangular and in broad contact. With increasing frontal length the prefrontals become long and narrow, obliquely orientated and only in short contact. A high prefrontal obliquity can be attained before the elongate anterior corner of the frontal is split off to form a median shield. In extreme cases of frontal elongation not only a median shield is formed but the elongate prefrontals each divide transversely to form 4 prefrontals (or occasionally 3 when only one side divides). (See M.A. Smith 1926: 20 fig. 10.)

Upper labials, especially the anterior ones, are prone to horizontal division, usually the first 3, sometimes 2 or 4 (once 5) divided. Ten

upper labials occur occasionally, mainly because of vertical division of the basal portion of the horizontally divided sixth labial. Eight labials occur when the first and second labials fuse. With one exception (count of 22) subcaudal range is 25-34.

Distribution

From Torres Strait south in the Gulf of Carpentaria to Weipa and on the Australian East Coast to about Brisbane, occasionally wandering as far south as Kiama, New South Wales and on the Western Australian coast from Broome south to Exmouth Gulf.

Material examined

New South Wales: AM 7118 (Kiama). *Queensland:* QM J3773 (Woody Point); QM J3310 and QM J3335 (Moreton Bay); QM J4675 (Caloundra); QM J4359 (35 miles east of Mooloolah Heads); QM J8734 (Pialba); AM R15089 (Heron Island); AM R19137, AM R21450-51, R21453-55 (Swain Reefs); AM 7740 (Port Denison); AM 6804 (Cleveland Bay); AM R18254, WAM R14151 and R23635 (Weipa). *Western Australia:* (unless otherwise stated WAM material) R14136, 949 and MCZ 29786 (Broome); R14207 (Roebuck Bay); R14505 and R14366 (Dampier Archipelago); R22384-85 (Locker Island, off Onslow); R27206 (Onslow area); R26414 (Exmouth Gulf).

Aipysurus laevis pooleorum subsp. nov.

Holotype

R21366 in Western Australian Museum. An adult male collected by Messrs W. and W. Poole in September 1963 at Shark Bay, Western Australia.

Paratypes

WAM R11140-41, R21364-65, R22419, R25608 (Shark Bay), R21367 (presumably Trigg, near Perth).

Diagnosis

Distinguishable from the nominate race by its darker colour and smaller size and by males having tuberculate dorsals and ventrals.

Description

Maximum length: males 943 mm, females 1140 mm. Maximum girth: males 112 mm, females 185 mm. Head shields susceptible to variation as nominate race, although extremes of prefrontals-frontal fragmentation are not present.

Rostral wider than high. Nasals entire, separated from 1 or 2 preoculars by a loreal. Postoculars 2 or 3. Prefrontals 2, showing only a low degree of intrusion by the frontal. Frontal entire in 5 (out of 8) specimens. Parietals divided. Anterior temporals usually 3. Upper labials 8-10 (mostly 9), usually the first 3 horizontally divided, usually fourth to sixth entering the orbit. Lower labials 8 or 9. Usually both pairs of chin shields prominent, posterior pair separated by one or more small scales.

Dorsal and ventral scales tuberculate in males, tubercles most pronounced on rows closest to ventrals.

Ventrals: 146-159. Subcaudals: males 30-33, females 25-28.

Females dark purplish-brown, flanks with fairly regular oblique pale bars on flanks, most pronounced posteriorly. Males generally brownish on back, merging with paler brown of flanks.

Distribution

Mid-west coast of Western Australia at Shark Bay.

Variation

Two specimens have the frontal unequally transversely divided; in another it is divided into 5. In one specimen the third to fifth labials enter the orbit.

Remarks

Named after the Poole brothers, professional fishermen who have collected many sea snakes in Shark Bay including the holotype and most of the paratypes of this subspecies.

DISCUSSION

Concerning the type of *A. laevis* M.A. Smith (1926: 20) writes 'the specimen is now lost and, except for Lacépède's brief description and the crude figure which accompanies it, there is no record to tell us what it really was'. On the contrary I consider the following information from the original description sufficient to identify Lacépède's snake.

- (i) The head is flattened and covered with 13 shields of which the 7 first from the direction of the snout form 2 rows of 2 pieces and a row of 3 and of which the eighth is surrounded by 5 other pieces disposed like the petals of a rose. [The 2 rows of 2 probably refer to the nasals and prefrontals; the row of 3 to the supraoculars and frontal; the eighth with 5 pieces disposed around it to the divided parietals.]
- (ii) 151 ventrals
- (iii) 28 subcaudals
- (iv) length at least 1290 mm
- (v) dorsals 'en losange'.

Four of the seven species of *Aipysurus* have either ventral or subcaudal counts (or both) inconsistent with the original description. They are: *A. tenuis* (ventrals 187-192, subcaudals 37); *A. fuscus* (v 156-172, s 24-37); *A. apraefrontalis* (v 144-160, s 19-25); and *A. duboisii* (v 154-181, s 25-30).

A. apraefrontalis, *A. duboisii* and *A. fuscus* have additional inconsistencies. The nature of the dorsal scales of *apraefrontalis* is not consistent with (v) above. The character of the head shields of *duboisii* (which with the exception of the rostral and nasals are entirely fragmented) makes a head shield count of 13 impossible. *A. fuscus* has not been recorded from the Australian coast; moreover its length does not exceed 720 mm.

Similarly *A. foliosquama* has not been recorded from the Australian coast

and barely attains half the length of Lacepede's snake. The nature of its dorsal scales also eliminates it from consideration.

A. eydouxi is a relatively small species (up to 950 mm); parietals are always entire, which allows a count (using Lacépède's method) of only 9 head shields. *A. laevis* (*sensu* Günther and others) is thus the only species of *Aipysurus* consistent with all data in the original description.

The type of *A. laevis* was collected by the Baudin Expedition in 'New Holland'. The only part of the Australian coast explored by the Baudin Expedition which encompasses the range of *A. laevis* is that between Shark Bay and Broome. As two subspecies of *A. laevis* occur in these seas the question arises which is the nominate. There are really too few data for identifying Lacépède's snake to subspecies, but in view of its length it almost certainly belonged to the northern. However, to put the matter beyond argument I select a northern specimen as neotype of *A. laevis*, viz. WAM R22384 an adult female collected by J. Seabrook on 2 August 1963 near Locker Island, off Onslow [in Lat. 21° 44' S, Long. 114° 46' E], Western Australia.

Aipysurus duboisii Bavay

Reference

M.A. Smith (1926: 21)

Diagnosis

Distinguished by the fragmentation of the head shields (with exception of rostral and nasals) into small, irregular tuberculate scales.

Description

A moderately large snake, the largest specimen being 1036 mm.

Rostral wider than high. Upper labials 9, only the first entire, remainder horizontally divided, fifth to seventh entering orbit. Lower labials 8 or 9, the first excluded from the oral margin. No chin shields prominent.

Midbody scale rows 19; scales smooth, imbricate. Ventrals 181, subcaudals 15.

Ground colour creamy brown with 24 blue grey bands on the body, confluent on the back, tapering rapidly to a point on the flanks. Head dark brown.

Distribution (Western Australia)

Known from a single female collected in Exmouth Gulf.

Remarks

M.A. Smith's series comprised only males. He records ventrals 154-163; subcaudals 27-30. I have examined two females and a male (extralimital material). The females have ventral counts of 169 and 175, subcaudals 25 and 27.

Material examined

WAM R26416 (Exmouth Gulf); AM 8641 (McCulloch Reef, Great Barrier Reef); AM R20779 (Chesterfield Reef, Coral Sea); AM 6723 (Australia).

Aipysurus apraefrontalis Smith

Reference

M.A. Smith (1926: 24)

Diagnosis

Prefrontals absent.

Description

A moderately large snake, the largest specimen being 1083 mm. Head extremely small. Head shields entire, symmetrical.

Rostral wider than high. Nasal in contact with the preocular, supraoculars and frontal. Preocular single, much longer than deep; postoculars 2, the lower fused with the sixth or seventh upper labial. Lower labials 6 or 7.

Midbody scale rows 17; scales smooth, strongly imbricate. Ventrals 150-160. Subcaudals 18-22.

Ground colour creamy with 24-27 bluish brown bars on the back which taper rapidly to a point on the flanks. Head brown.

Distribution

North-west coast of Western Australia from Broome south-west to Exmouth Gulf.

Remarks

Head figured by M.A. Smith (1926: 25, fig. 13).

Material examined

WAM R26716 (Broome); R22961 (Roebourne); R26415, R41261 (Exmouth Gulf).

Aipysurus tenuis Lönnberg and Andersson

Diagnosis

Ventral and subcaudal counts high (187-192 and 37 respectively).

Description

A moderately large species (up to 1020 mm) resembling *A. laevis* but much more slender, especially anteriorly.

Rostral much wider than high. One preocular, postoculars 2. Frontal partly divided. Upper labials 7 or 8, often horizontally divided, especially anteriorly. Parietals irregularly divided. 2 or 3 small anterior temporals.

Scale rows 19, all scales smooth and imbricate in the female; the outer three or four rows with a small tubercle in the male. Ventrals with a series of small tubercles along the free margin. Ventrals 187-192; subcaudals 37.

Light brown with dark brown spots on tips of scales forming longitudinal lines on the back and more or less distinct cross bars on sides. Belly almost unspotted. Head above dark brown.

Distribution

Known only from the type locality (Cape Jaubert, south of Broome,

Western Australia).

Remarks

The above description is based on the original (Lönnerberg and Andersson 1913: 13) and M.A. Smith (1926: 18).

Aipysurus eydouxii (Gray)

Reference

M.A. Smith (1926: 14).

Diagnosis

The presence of prefrontals distinguishes this sea snake from *A. aprae-frontalis* (the only other *Aipysurus* with 17 scale rows).

Description

A relatively small *Aipysurus* (up to 950 mm). Head shields symmetrical and entire.

Rostral slightly wider than high. Nasal in contact with the single preocular. Postoculars 2. Frontal 1-1.3 times as long as wide, and as wide as or slightly wider than the supraoculars which are entire. Upper labials 6, the fourth under the eye; lower labials 6. Anterior temporals 1, 2 or 3 (mostly 2).

Scales in 17 weakly imbricate rows at midbody. Ventrals 139-150, subcaudals 27-33 (males 32 and 33, females 27-30).

Ground colour brownish yellow to golden brown with a dorsal pattern of ill defined greyish or brownish bars, most conspicuous on the flanks, tending to break up on the back. Scales on the back and those of lateral bars dark edged.

Distribution (Western Australia)

North-west coast of Barrow Island and (?) Broome.

Remarks

The above description is based on 7 specimens from Queensland and 1 from Western Australia.

Specimen WAM R14118 is unique in having: 164 ventrals; 33 subcaudals; the fourth and fifth upper labials entering the orbit; each parietal divided into 2; the prefrontals very small and triangular, their apices meeting the anterior point of the frontal and the median suture of the nasals at a common point. The high ventral and subcaudal counts and the divided parietals suggest that this specimen could be referred to *A. fuscus*. However, the chance that other characters it possesses (17 scale rows; 6 upper labials and a banded body pattern) which are all rare in *A. fuscus* should coincide in one specimen is very unlikely; consequently I refer it tentatively to *A. eydouxii*.

The specimen MCZ 29786 referred to *eydouxii* by Loveridge is in fact *A. laevis laevis*.

Material examined

Queensland: QM J4681 (Sandgate); AM 6703 and 8301 (Port Denison); AM R17623 (Weipa); WAM R23624 (Gulf of Carpentaria); QM J2001

(Queensland); AM 13805 (North Australian coast). Western Australia: WAM R14118 (Broome); R28496 (Barrow Island).

Genus *Hydrophis* Latreille

Reference

M.A. Smith (1926: 40).

Four species of *Hydrophis* occur in Western Australian waters. They are moderate to large in size.

Head shields symmetrical and entire; second upper labials in contact with the preocular; a short cleft runs from the nostril to second labial. Ventrals 197-401, at most twice as wide as adjacent dorsals. Scale rows at widest part of body 33-57, the scales juxtaposed to weakly imbricate.

Owing to the similarities of the following four species a combination of characters is required to separate them. One of the most useful characters is colour pattern; the younger the specimen the better the definition. Age decreases the contrast between ground colour and dorsal pattern, reducing its reliability as a character.

Hydrophis ocellatus Gray

Reference

M.A. Smith (1926: 84).

Diagnosis

Distinguished from the other species of *Hydrophis* by its high number of scale rows (47-57).

Description

A moderately large snake (to 1262 mm), slender anteriorly. Canthus rostralis may or may not be prominent.

Rostral wider than high. Nasals less than twice as wide as rostral. Nostril pierced closer to the posterior border than the lateral border of the nasals. One preocular; 2 postoculars (once 3). Temporals: 1 or 2 anterior, sometimes one large posterior. Upper labials 6, 7 or 8, third and fourth entering orbit. First 4 or 5 lower labials much deeper than long, remainder gradually decreasing in size backwards. Anterior pair of chin shields only partly divided by the first pair of lower labials; posterior pair usually just in contact by small scales.

Nuchals 33-37; scale rows at widest point of body 47-57 (increase 14-24); scales juxtaposed, hexagonal and with a short keel. Ventrals 290-340, each with a pair of short keels.

Olivaceous, grey or whitish with a series of ovals or broad bars (never bands) on the back and scattered spots on the flanks. Some specimens with narrow dark bars anteriorly, 1 or 2 scales wide and 3 or 4 scales apart.

Distribution

North-west coast of Western Australia from 65 miles west of Dampier south-west to Exmouth Gulf, straggling to lower west coast south as far as Busselton.

Material examined

WAM R36669-72 (65 miles west of Dampier), R26523 (Exmouth Gulf), R13554 (Rottneest Island), R9578 (Busselton).

Hydrophis major (Shaw)

Reference

M.A. Smith (1926: 70).

Diagnosis

Distinguished from other species of *Hydrophis* by having not more than 255 ventrals.

Description

A robust snake of fairly uniform thickness throughout body. Head short and thick; canthus rostralis always prominent. Grows to 1094 mm. (M.A. Smith records 1710 mm).

Rostral as wide as, or slightly wider than high. Nasals not less than twice as wide as rostral. Nostril pierced closer to the posterior border than the lateral border of the nasal. Preocular 1; postoculars 2 (rarely 1). Anterior temporals usually 2. Upper labials 7 or 8, third and fourth entering orbit. First 3 lower labials deep, the first partly or almost separating the well developed anterior chin shields. Remaining lower labials small and of equal size. Posterior pair of chin shields usually poorly developed. Nuchals in 31-36 rows. Scales around thickest part of body in 33-41 rows (increase 2-10) weakly imbricate and keeled. Ventrals 197-255, each with a pair of keels.

Ground colour yellowish or white with 24-30 blackish dorsal bars (never bands). Interspaces between bars with a very narrow bar. There is a spot on the flanks at either end of each narrow bar. Ventrals usually edged with black. Head yellowish with darker markings.

Distribution

North-west and upper west coasts of Western Australia from Broome south to Shark Bay, straggling to lower south coast.

Material examined

WAM R37220-27 (Koks Island, 20 miles NW of Carnarvon); R11304 (Bernier Island), R26827 (Dorre Island); R12485, R13469 (Dirk Hartog Island); R13869-70, R20576, R21360-63, R22424, R22606-07, R22627, R25603-04, R25874, R26863-64, R27207-08 (Shark Bay), R22295, R22039-40, R24016 (Carnarvon), R40559-60 (off Carnarvon); R4962 (Bunbury).

Hydrophis kingii Boulenger

Reference

M.A. Smith (1926: 46).

Diagnosis

Distinguished from other species of *Hydrophis* by its black head with a white orbital ring.

Description

Body long, slender anteriorly. Head small, elongate; canthus rostralis weak or absent. Grows to 1630 mm.

Rostral as wide as, or slightly wider than high. Nasals never as much as twice as wide as rostral. Nostril pierced closer to the posterior than the lateral border of the nasals. Preocular 1, postoculars 2 (once 3). Temporals: 1 anterior, 2 posterior. Upper labials 7 or 8, third and fourth entering orbit. First 2 or 3 lower labials large, remainder small. Two pairs of chin shields, prominent, in contact medially.

Nuchals 22-29; scales at thickest part of body 34-39 (increase 12-17), the scales keeled and imbricate mid-dorsally to smooth and weakly imbricate on flanks. Ventrals 299-337.

Ground colour yellowish with a light grey back, becoming darker posteriorly. 45-46 darker grey bars, more or less oval anteriorly, becoming truncate posteriorly. No narrow dark bars in the interspaces. Ventrals black. Head with a narrow white bar separating the black of the head from the first dorsal bar; white orbital ring present.

Distribution

North-west coast of Western Australia and (?) Barrow Island, straggling to lower south-west coast.

Material examined

WAM 17 (Cape Jaubert), R29170 (? near Barrow Island); R23830 (Safety Bay).

Hydrophis elegans (Gray)

Reference

M.A. Smith (1926: 54).

Diagnosis

Distinguished from other species of *Hydrophis* by its high ventral count (354-401) and its colour pattern which consists of black bands, constricted on sides (of thinner parts of body) and bars on back and belly where the bands have been broken (thicker parts of body). No white orbital ring.

Description

Body long, slender anteriorly. Head small, elongate. Canthus rostralis never prominent. Grows to approximately 1525 mm (M.A. Smith records 2240 mm).

Rostral as wide as high. Nasals less than twice width of rostral. Nostril almost touching posterior and lateral borders of nasal. Preocular 1; postoculars 2 (rarely 1). One large anterior temporal. Upper labials 6 or 7, third and fourth entering orbit. First two or three labials deep, remainder small. Two pairs of chin shields prominent; anterior pair the longest, always in broad contact; posterior pair always separated by a small scale.

Nuchals in 25-30 rows. Scales around thickest part of body in 35-45 rows (increase 10-20); weakly imbricate, smooth or with a short keel. Ventrals smooth, 354-401 (? 314), slightly wider than adjacent dorsals. 39-44 blackish dorsal bars or bands, the bands tending to be constricted on flanks and confined to tail and thinner parts of body. Bands which have been broken at constriction form a dorsal and ventral bar. These bars are confined to thicker parts of body. Interspaces between bars and bands on back have a row of small black dots, while on flanks there is a small black spot. Ventrals with a dark longitudinal line (most pronounced in juveniles). Head blackish in juveniles, grey or olivaceous in adults.

Distribution

North-west and upper west coasts of Western Australia from King Sound south to Shark Bay, straggling to lower west coast.

Material examined

WAM R13839 (Telegraph Pool, Fitzroy River); R37218-19 (Koks Island, 20 miles NW of Carnarvon); R12453 (Dirk Hartog Island); R37228, R40555-58 (off Carnarvon); R1940-41 (Carnarvon), R24841 (10 miles west of Kalbarri); R8197, R8577 (Perth metropolitan beaches); R17323 (Safety Bay); R14165, R19121 (Mandurah); R11464, R7437 (Geographe Bay).

Genus *Acalyptophis* Boulenger

Reference

M.A. Smith (1926: 101).

Acalyptophis peronii (Dumeril)

Reference

M.A. Smith (1926: 102).

Diagnosis

Distinguishable from other sea snakes whose ventrals are only slightly wider than adjacent dorsals by nasal being in contact with preocular.

Description

A large species (up to 1230 mm); slender anteriorly and with a small head, the shields of which are spinose owing to their posterior borders being raised and pointed, a condition which becomes more pronounced with age.

Rostral wider than high. Nasals not entire, in contact with single preocular. Postoculars 3. No temporals distinguishable. Upper labials 6 or 7, second to

fourth entering orbit. Lower labials 9 and 10, the first 4 in contact with two pairs of chin shields.

Scale rows at widest part of body 27-28, the scales subimbricate, keeled and wider than long posteriorly. Ventrals 142-203.

Colour varies from drab grey on back and whitish on flanks and belly to a pale cream with darker cross bars tapering to a point on the flanks.

Distribution

North-west coast of Western Australia from Broome south-west to Barrow Island.

Remarks

Head figured by Smith (1926: 103 fig. 29).

Material examined

WAM R20360 (Broome); R16c (Cape Jaubert); R29585 (Barrow Island).

Genus *Astrotia* Fischer

Reference

M.A. Smith (1926: 113).

Astrotia stokesii (Gray)

Reference

M.A. Smith (1926: 113).

Diagnosis

The strongly imbricate, bifurcate ventrals distinguish this sea snake from all others.

Description

A massive snake. A specimen in the WAM collection is about 1500 mm long and 262 mm in girth. Head shields symmetrical, entire.

Rostral slightly wider than high. A short cleft running from nostril to second labial. Preocular 1; postoculars 2. Frontal about 1.5 times as long as wide and twice as wide as the supraoculars. Anterior temporals 2. Labials often horizontally and vertically divided. Upper labials 10 or 11, third to fifth entering orbit. Lower labials 12 or 13, a sharp decrease in size after second or third. No chin shields prominent.

Midbody scale rows 54-60, scales strongly imbricate. Ventrals 252-280, all but a few anterior ones bifurcate.

Ground colour yellowish or pale brown with large black or darker brown bars (sometimes almost ovals) between which there are narrower bars. Head black or dark brown. The dorsal pattern of the Exmouth Gulf specimen is almost obliterated, being a fairly uniform greyish green.

Distribution

North-west coast of Western Australia from Point Coulomb south-west to Exmouth Gulf.

Material examined

WAM R40281 (Point Coulomb); 10705, R21359 (Port Hedland); R26524 (Exmouth Gulf).

Genus *Hydrelaps* Boulenger

Reference

M.A. Smith (1926: 30).

Hydrelaps darwiniensis Boulenger

Reference

M.A. Smith (1926: 30).

Diagnosis

Distinguished from all other sea snakes by the absence of preocular.

Description

A small snake (up to 525 mm) of fairly uniform thickness throughout body. Head moderately large; head shields entire, symmetrical, no canthus rostralis. Tail slightly downcurved.

Rostral as wide as, or slightly wider than high, and as wide as, or slightly wider than frontal, which is as long as, to twice as long as, wide (mostly as long as, or slightly longer than wide). Supraocular as wide as, to half as wide as, frontal. One postocular, Temporals: 1 anterior, 1 or 2 posterior. Upper labials 6 (5 once on one side), third and fourth entering orbit; lower labials mostly 7 (sometimes 6), the fourth the largest. Two pairs of chin shields prominent, in contact; posterior pair the longer.

Midbody scale rows 25 or 26 (mostly 25), the scales smooth; rows on lower flanks juxtaposed; remainder of dorsals imbricate. Ventrals 160-179; twice as wide as adjacent dorsals. Subcaudals 20-36 (males 29-36, females 20-29).

Ground colour light grey or yellowish with 35-44 (occasionally confluent) bands on body, widest on back where they may enclose a pale spot and (sometimes) be widened on the belly; the adjoining ventrals on either side of each band blackened so that the majority of ventrals appear black. Head bluish grey.

Distribution

Kimberley and north-west coasts of Western Australia from Cambridge Gulf south-west to Cossack.

Material examined

WAM R11176 (Forrest River Mission); R13679, R19990 (Derby); R14119, R14206, R28115, R22346, R31205 (Broome).

Ephalophis greyi M.A. Smith

Diagnosis

Distinguished from *Aipysurus duboisii* (the other species of sea snake with 19 scale rows and broad ventrals) by its smooth symmetrical head shields and from *Hydrelaps darwiniensis* (the other small, greyish dark banded species) by presence of a preocular.

Description

A small sea snake (up to 661 mm). Body slightly tenuous anteriorly. Head small, canthus rostralis discernible but not prominent. Tail downcurved.

Rostral as wide as, or slightly wider than the frontal, which is 1.5 to 2 times as long as wide, and always wider than a supraocular. Preocular 1; postocular 1. Temporals: 1 anterior and 2 posterior (3 on one side once). Upper labials 6, second in contact with preocular, third and fourth entering orbit. Lower labials 7 (once 6), the fourth largest. Two pairs of chin shields prominent, in contact, posterior pair (the longer) almost separated by a small scale.

Midbody scale rows 19 (once 21), scales on the lower 4-6 rows on the flanks hexagonal, juxtaposed and smooth. Remaining dorsals imbricate, bluntly keeled, often with darker edgings. Ventrals 151-184 at midbody, at least 3 times as wide as adjacent dorsals; narrower anteriorly. Subcaudals 24-33 (males 27-33, females 24-27).

Ground colour of adults grey with 27-30 dark grey to black incomplete bands (broken at ventrals), widest on back, their boundaries sometimes indistinct, and often confluent, and forming a zig-zag pattern down the back. In some specimens bands are faded mid-laterally leaving a dorsal bar and a spot on the lower flanks.

Ground colour of juveniles almost white or light grey with dark bands much more conspicuous. Ventrals light grey. Subadults with head mottled light and dark grey, the light grey remaining as a pale mark on posterior edge of upper and lower labials.

Distribution

North-west and upper west coasts of Western Australia from King Sound south to Carnarvon.

Remarks

Figured by Smith 1931: 399. It inhabits mangrove creeks where it moves in and out with the tide searching crab holes for food.

The specimen MCZ 29788 referred to *Lapemis hardwickii* by Loveridge (1934: 295) is in fact *Ephalophis greyi*.

Material examined

WAM R3771 (Derby); R8820, R29158, R31203 (Broome); R28114, R36715 (La Grange); R2136 ('New De Grey Station'); R13658-59 (Cossack);

R25668(Point Samson); R29582-84 (King Bay, 20° 38' S, 116° 45' E); R5043 (50 miles from Exmouth Gulf), R32024 (Carnarvon).

Genus *Pelamis* (Daudin)
See Smith (1926: 116)

Pelamis platurus (Linnaeus)
See Smith (1926: 116)

Diagnosis

The yellow belly which is sharply defined from the bluish black back by a straight line distinguishes this sea snake from all others.

Description

A relatively small snake from 473-815 mm.

Rostral as wide as high. Preoculars 1 (rarely 2), postoculars 2 (rarely 3). Upper labials usually 7 (sometimes 8, once 6), the fourth and fifth usually separated from the orbit by suboculars. Lower labials 10 or 11, the first 5 usually large. Anterior pair of chin shields usually prominent.

Midbody scale rows 48-69; ventrals 240-375. hardly distinguishable from from adjacent dorsals, often bifurcated.

Distribution

Lower west coast of Western Australia from Dongara south to Busselton.

Remarks

This is the sea snake most commonly found derelict on south-west beaches; 87% of specimens examined were collected on Perth metropolitan beaches in June, July, August and September, usually after heavy winter storms.

Smith (1926: 118) lists 7 colour varieties. Western Australian specimens with one exception belong to colour varieties 1 and 2, that is, they are black above, yellow below (var. 1) or black above, brown below with an intervening stripe of yellow (var. 2). The yellow stripe is often indistinct. The tail is usually lighter yellow than the belly, and spotted or barred with black.

The colour pattern of the specimen from Dongara is unique. It fits Smith's description of var. 6 except that the anterior half is immaculate pale yellow.

Material examined

WAM R29609 (Dongara); R21574 (Ledge Point); 38 specimens from Perth metropolitan beaches (Waterman Bay to Shoalwater Bay); R15363, R779 (Rottnest Island); R15815 (Garden Island); R1147, R14168 (Mandurah); R10351, R20575 (Bunbury); R1965 (Wonnerup); R10282, R22682, R150 (Busselton).

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I am grateful to Benjamin Shreve, Research Associate in Herpetology, Museum of Comparative Zoology for examining specimen MCZ 29788 for me. It is *Ephalophis greyi* and not *Lapemis hardwickii*.

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REFERENCES

- DUMÉRIL, A.M.C., G. BIBRON & A. DUMÉRIL (1854). — *Erpétologie générale* 7 (2). Paris.
- GRAY, J.E. (1846). — A new genus of Sea Snake from Port Essington. *Ann. Mag. Nat. Hist.* 18 (1846): 284.
- LACÉPÈDE, B.G.E. de la V. (1804). — Memoire sur plusieurs animaux de la Nouvelle-Hollande dont la description n'a pas encore été publiée. *Ann. Mus. Nat. Hist. Paris* 4: 184-211.
- LÖNNBERG, E. & L.G. ANDERSSON (1913). — Results of Dr E. Mjöberg's Swedish Scientific Expeditions to Australia 1910-13. III. Reptiles. *K. Svenska VetenskAdad Handl.*, 52 (3): 13.
- LOVERIDGE, A. (1934). — Australian reptiles in the Museum of Comparative Zoology. *Bull. Mus. Comp. Zool.* 77 (6).
- McDOWELL, S.B. (1969). — Notes on the Australian sea-snake *Ephalophis greyi* M. Smith (Serpentes: Elapidac, Hydrophiinae) and the origin and classification of sea-snakes. *Zool. J. Linn. Soc.* 48: 333-349, 1 fig.
- (1972). — The genera of sea-snakes of the *Hydrophis* group (Serpentes: Elapidac). *Trans. zool. Soc. Lond.* 32: 189-247.
- PÉRON, F. (1809). — A voyage of discovery to the southern hemisphere performed by order of the Emperor Napoleon during the years 1801, 1802, 1803 & 1804. Lond., R. Phillips 310 pp. illust.
- SMITH, M.A. (1926). — Monograph of the sea-snakes (Hydrophiidae), xxii + 130 pp., 2 pls. London. British Museum.
- (1931). — Description of a new genus of sea-snake from the coast of Australia with a note on the structures providing for complete closure of the mouth in aquatic snakes. *Proc. zool. Soc. Lond.* (2) 1931: 397-398.